

CLAIMS

What Is Claimed Is:

1. A configurable loop filter system for a video decoding system, comprising:
 - a control unit for receiving management information and outputting configuration data and control data, the configuration data and control data being conveyed by the received management information;
 - a configurable loop filter unit for receiving decoded video data and outputting filtered decoded video data based on one of a plurality of predetermined filter modes, each of the plurality of predetermined filter modes being determined by the configuration data and control data;
 - a switch unit for receiving the decoded video data and the filtered decoded video data and selectively outputting one of the decoded video data and the filtered decoded video data as decoded output data based on the control data; and
 - a storage unit for selectively storing the filtered decoded video data, the stored filtered decoded video data being used as a reference video data.
2. The configurable loop filter system of Claim 1,
 - wherein the configuration data includes at least one filter parameter for each filter mode.
3. The configurable loop filter system of Claim 1,
 - wherein the storage unit selectively stores a predetermined decoded video data based on the control data.
4. The configurable loop filter system of Claim 1,
 - wherein at least one of the predetermined filter modes is adaptive.

5. A video decoding system, comprising:

a demultiplexer unit for receiving a video data structure and outputting an encoded video data, a motion data, and an intra-prediction mode data, the demultiplexer unit extracting the encoded video data, the motion data, and the intra-prediction mode data from the video data structure, the encoded video data including a plurality of transformed and quantized image samples;

a summing unit for receiving the encoded video data and an encoded prediction data to produce a summing output data, the summing output data being an arithmetic sum of the encoded video data and the encoded prediction data;

a decoding unit for receiving the summing output data and outputting a decoded video data;

a loop filter unit for receiving the decoded video data and outputting a filtered video data based on one or more predetermined filter modes, the loop filter unit being configured by one or more loop filter parameters, the loop filter unit receiving a first control data for selecting one of the one or more predetermined filter modes;

an output switch unit for receiving the decoded video data, the filtered video data, and the first control data, the output switch unit selectively outputting one of the decoded video data and the filtered video data as decoded output data based on the value of the first control data, the first control data value being set to efficiently decode the encoded video data; and

a prediction unit for receiving the filtered video data, the motion data, the intra-prediction mode data and a second control data and outputting an encoded prediction data, the encoded prediction data for modifying the decoding of subsequently received encoded video data.

6. The video decoding system of Claim 5, wherein the decoding unit further comprises:

an inverse quantization unit for receiving the summing output data and outputting a transformed video data, the summing output data having a first predetermined bit length and the transformed video data having a second predetermined bit length; and

an inverse transform unit for receiving the transformed video data and outputting a decoded video data, the inverse transform unit providing a transformation of the transformed video data from the frequency domain to the spatial domain.

7. The video decoding system of Claim 6,

wherein the transformation provided by the inverse transform unit is an inverse discrete cosine transform like (IDCT-like) mathematical transform.

8. The video decoding system of Claim 5, wherein the loop filter unit further comprises:

a first filter offset value and a second filter offset value operable to determine a first filter mode with a predetermined first filter strength;

a third filter offset value and a fourth filter offset value operable to determine a second filter mode with a predetermined second filter strength,

wherein the first control data selects one of the first filter mode and the second filter mode.

9. The video decoding system of Claim 5,

wherein one or more video data structures are stored on a recording storage medium.

10. The video decoding system of Claim 5,
wherein one or more video data structures are carried within a bitstream.

11. The video decoding system of Claim 5, wherein the prediction unit further comprises:

a frame memory unit for receiving the filtered video data and selectively storing a reference video data, the frame memory unit outputting an inter-prediction reference video data and an intra-prediction reference video data;

an inter-prediction unit for receiving the inter-prediction reference video data and the motion data and outputting an inter-prediction data, the inter-prediction unit for providing prediction information for predicting encoded video data changes between one or more encoded video data samples;

an intra-prediction unit for receiving the intra-prediction reference video data and the intra-prediction mode data and outputting an intra-prediction data, the intra-prediction unit for providing prediction information for encoded video data changes within an encoded video data sample;

a second switch unit for receiving the inter-prediction data and the intra-prediction data and outputting a prediction data, the second switch unit receiving a second control data for selecting between outputting the inter-prediction data and the intra-prediction data;

a transform unit for receiving the prediction data and outputting a transformed prediction data, the transform unit providing a transformation of the prediction data from the spatial domain to the frequency domain; and

a quantization unit for receiving the transformed prediction data and outputting the encoded prediction data, the transformed prediction data being represented in a

binary word having the second bit length, the encoded prediction data being represented in a binary word having the first bit length.

12. The video decoding system of Claim 11,
wherein the transformation provided by the transform unit is a discrete cosine transform like (DCT-like) mathematical transform.

13. A recording medium comprising:
a data information region for storing a plurality of video data structures representing at least video data; and
a management information region for storing loop filter information associated with the respective plurality of video data,
wherein the management information controls setting loop filtering applied to the corresponding video data.

14. The recording medium of Claim 13,
wherein the management information indicates one of a first filter mode and a second filter mode.

15. The recording medium of Claim 13,
wherein the management information is effective for setting loop filtering architecture and parameters applied to the corresponding video data for at least the reproduction period of the video data.

16. A method of efficiently decoding selectively filtering encoded video data, comprising:
receiving an encoded video data, a first control data, and a configuration data;
decoding the encoded video data to produce a decoded video data;

filtering the decoded video data based on the first control data and the configuration data to produce a filtered decoded video data;

outputting one of the decoded video data and the filtered decoded video data based on the first control data.

17. A configurable video decoding architecture, comprising:

a control unit for receiving a management information and outputting configuration data and control data; and

a dual-use loop filter unit for receiving a decoded video data, the configuration data, and the control data, the configuration data including two or more filter offset parameter data sets, the offset parameter data sets being composed of at least two offset parameters each, the filter offset parameters being selected from a table of values based on the operation of the loop filter unit as one of a deblocking filter and a reference picture filter.

18. A video decoding system, comprising:

a control unit for receiving management information and outputting configuration data and control data, the configuration data and control data being conveyed by the received management information;

a configurable loop filter unit for receiving decoded video data and outputting filtered decoded video data based on one of a plurality of predetermined filter modes, each of the plurality of predetermined filter modes being determined by the configuration data and control data;

a switch unit for receiving the decoded video data and the filtered decoded video data and selectively outputting one of the decoded video data and the filtered decoded video data as decoded output data based on the control data; and

a prediction unit for selectively storing filtered decoded video data as a reference video data, the reference video data being used to produce an encoded prediction data that is arithmetically combined with one or more encoded video data.

19. The video decoding system of Claim 18, the prediction unit further comprising:

an inter-prediction unit for receiving the reference video data and the motion data and outputting an inter-prediction data, the inter-prediction unit for providing prediction information for predicting encoded video data changes between one or more encoded video data samples;

an intra-prediction unit for receiving the reference video data and the intra-prediction mode data and outputting an intra-prediction data, the intra-prediction unit for providing prediction information for encoded video data changes within an encoded video data sample; and

a second switch unit for receiving the inter-prediction data and the intra-prediction data and outputting a prediction data, the second switch unit receiving a second control data for selecting between outputting the inter-prediction data and the intra-prediction data.

20. A machine-readable medium having one or more instructions for decoding video from a communication channel, which when executed by a processor, causes the processor to perform operations comprising:

receiving an encoded video data, a first control data, and a configuration data;

decoding the encoded video data to produce a decoded video data;

filtering the decoded video data based on the first control data and the configuration data to produce a filtered decoded video data; and

outputting one of the decoded video data and the filtered decoded video data based on the first control data.

21. The machine-readable medium of Claim 20, which when executed by a processor, causes the processor to perform operations further comprising:

storing a predetermined decoded video data as reference video data, the reference video data being used in the reproduction of one or more video pictures.